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EXAMINER	
PROCTOR, JASON SCOTT	
ART UNIT	**PAPER NUMBER**
2123	

DATE MAILED: 12/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/966,015	ZIMMER, VINCENT J.	
	Examiner	Art Unit	
	Jason Proctor	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 September 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/21/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-20 have been submitted for examination.

2. Claims 1-20 have been rejected.

Drawings

3. The drawings are objected to because Figs. 2-4 do not have satisfactory reproduction characteristics. See 37 CFR 1.84(l). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. § 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-20 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to nonstatutory subject matter. MPEP 2106(II)(A) states:

> The claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96); In re Ziegler, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)). Accordingly, a complete disclosure should contain some indication of the practical application for the claimed invention, i.e., why the applicant believes the claimed invention is useful.

6. The method recited in claims 1-6, the method recited in claims 7-8, the machine-readable medium recited in claims 9-14, and the apparatus of claims 15-20 all lack a useful, concrete, and tangible result.

7. Further, MPEP 2106(IV)(B)(1) states:

> *In re Sarkar*, 588 F.2d 1330, 1333, 200 USPQ 132, 137 (CCPA 1978) ("[E]ach invention must be evaluated as claimed; yet semantogenic considerations preclude a determination based solely on words appearing in the claims. In the final analysis under 101, the claimed invention, as a whole, must be evaluated for what it is."

8. The invention recited in claims 1-20 is, when considered as a whole, computer software which provides an abstract execution environment but does not produce a tangible and concrete result. The claimed inventions are therefore regarded as computer software and therefore nonstatutory.

9. To expedite a complete examination of the instant application the claims rejected under 35 U.S.C. § 101 (nonstatutory) above are further rejected as set forth below in

anticipation of applicant amending these claims to place them within the four statutory categories of invention.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

11. Claims 5, 6, 13, 14, 19, and 20 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 5, 13, and 19 recite limitations including security-related information that is signature authentication and encrypted hash information. The disclosure contains no teaching of encrypted hash information.

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 7-8 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

14. Claim 7 recites a negative limitation which does not set forth definite boundaries for patent protection sought. The limitation "such that untrusted code is executed in sandbox mode such that the code is prevented from harming the system" covers any interpretation from "executes by infinite loop" to "executes a no-operation instruction and halts". The claim language covers any virtual machine monitor executing untrusted code so long as the code is "prevented from harming the system", which is itself ambiguous in the broad context of the limitations. See MPEP 2173.05(i).

15. Claims not specifically mentioned are rejected by virtue of their dependence.

Claim Interpretation

16. In the interest of compact prosecution, examiner makes the following claim interpretations in order to apply prior art to the claims. See *Ex parte Ionescu*, 222 USPQ 537 (Bd. Pat. App. & Inter. 1984).

17. Regarding claims 5, 6, 13, 14, 19, and 20, the limitations are interpreted including "encrypted hash information" as known in the art, such as in public key encryption.

18. Regarding claim 7, the phrase "such that untrusted code is executed in sandbox mode such that the code is prevented from harming the system" is interpreted as "such that untrusted code is executed in sandbox mode and isolated from the system".

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

> applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

19. Claims 1-3, 9-11, and 15-17 are rejected under 35 U.S.C. § 102(e) as being anticipated by Bugnion et al. US Patent No. 6,496,847 hereafter referred to as Bugnion.

20. Regarding claim 1, Bugnion teaches implementing a virtual machine monitor in a most privileged mode, and executing a virtual machine in a less privileged mode (column 4, lines 41-51; column 5, lines 17-24). Bugnion also teaches that the VMM may be implemented on x86 architecture (column 10, lines 31-48), which supports a native real mode (See Microsoft Computer Dictionary, "x86" and "80286", "80386DX"). Bugnion also teaches that the virtual machine, executing in a less privileged mode, executes an operating system including Microsoft DOS (column 18, lines 28-38). Microsoft DOS, commonly known as MS-DOS, supports operating in real mode, which includes directly addressing physical memory (See Microsoft Computer Dictionary, "real mode"). Therefore Bugnion teaches implementing a virtual machine monitor on a computer system with a native environment that executes in physical mode, executing the virtual machine monitor in a most privileged mode, and the virtual machine monitor emulating physical mode such that the native environment is executed in a less privileged mode.

21. Regarding claim 2, Bugnion teaches that the native environment can be x86 architecture (column 10, lines 31-48), which is a 32-bit environment (See Microsoft Computer Dictionary, "80386DX").

22. Regarding claim 3, Bugnion teaches that the VMM contains code to provide secure execution functionality (column 15, lines 43-56).

23. Claims 9-11 recite a machine-readable medium that provides executable instructions which perform the method of claims 1-3. As Bugnion teaches a computer-implemented method (column 4, lines 41-51), claims 9-11 are rejected for the same reasons given above for claims 1-3.

24. Claims 15-17 recite an apparatus comprising a computing system and a virtual machine monitor which implements the method of claims 1-3. As Bugnion teaches a computer-implemented method (column 4, lines 41-51), claims 15-17 are rejected for the same reasons given above for claims 1-3.

25. Claim 7 is rejected under 35 U.S.C. § 102(a) as being anticipated by Meushaw et al. PGPub US 2002/0169987 A1 hereafter referred to as Meushaw.

26. Regarding claim 7, Meushaw teaches implementing a virtual machine monitor such that untrusted code is executed in sandbox mode, referred to as a sensitive virtual machine, such that the code is prevented from harming the system (paragraphs 0015, 0024, 0025).

Claim Rejections - 35 USC § 103

27. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

28. Claims 4, 5, 12, 13, 18, and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bugnion as applied to claim 3 above, and further in view of Meushaw.

29. Regarding claim 4, Bugnion does not teach secure storage used to store security related information.

30. Meushaw teaches the use of a virtual machine for secure computing (paragraphs 0024, 0025) including secure storage used to store security related information (paragraph 0031).

31. It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to combine the teachings of Meushaw regarding security and a virtual machine manager with the invention of Bugnion in order to create a high performance virtual machine design with a security conscious design. Such a combination could be realized by implementing the security features taught by Meushaw with the structure of the virtual machine manager and virtual machine taught by Bugnion.

32. Regarding claim 5, Meushaw teaches that any suitable encryption method may be used to protect sensitive information connected to a secure virtual machine (paragraph 0027). Both digital signatures and public key encryption are encryption techniques known in the art (See Microsoft Computer Dictionary, "digital signature", "public key") and it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to use encryption techniques known in the art to implement the teachings of Meushaw regarding encryption.

33. Claims 12 and 13 recite a machine-readable medium that provides executable instructions which perform the method of claims 4 and 5. As Bugnion teaches a computer-implemented method (column 4, lines 41-51), claims 12 and 13 are rejected for the same reasons given above for claims 4 and 5.

34. Claims 18 and 19 recite an apparatus comprising a computing system and a virtual machine monitor which implements the method of claims 4 and 5. As Bugnion teaches a computer-implemented method (column 4, lines 41-51), claims 18 and 19 are rejected for the same reasons given above for claims 4 and 5.

35. Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Meushaw.

36. Meushaw does not expressly state that the virtual machine monitor executes legacy BIOS code in a manner that prevents the legacy BIOS code from harming the

system, however Meushaw does teach a virtual machine which implements the hardware environment of a computer platform in software (paragraph 0024) and isolating virtual machines from each other to prevent them from harming the system (paragraphs 0015, 0025). It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to recognize the necessity for such a virtual machine to implement the legacy BIOS code for a particular computer platform when designing a virtual machine for that computer platform. If the software to be run on the virtual machine expects certain features of the target platform, such as support for legacy BIOS drivers and services, then the virtual machine must support the BIOS code behavior or it would function inadequately. Therefore it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to execute legacy BIOS code on a virtual machine in an isolated, sandbox mode.

37. Claims 6, 14, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bugnion in view of Meushaw as applied to claim 5 above, and further in view of DeTreville US Patent No. 6,609,199 hereafter referred to as DeTreville.

38. Neither Bugnion nor Meushaw teach using security related information to create attestation logs.

39. DeTreville teaches an authenticated boot process (column 8, line 1 – column 10, line 3). DeTreville teaches using a public key corresponding to a signature on the boot block of the operating system (column 8, lines 9-11). DeTreville also teaches that the

authenticated boot process can create an attestation log of all components loaded into the operating system by recording a digest of each component as it is loaded.

40. It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to combine the authenticated boot process taught by DeTreville with combination formed in the rejection of claim 5 above in order to verify the integrity of the computer system for which security is necessary and to guard against executing code which has been tampered with. The combination could be achieved by incorporating the authenticated boot process taught by DeTreville with the virtual machine taught by Bugnion so that the virtual machine authenticates the code it executes and produces an attestation log.

41. Claim 14 recites a machine-readable medium that provides executable instructions which perform the method of claim 6. As Bugnion teaches a computer-implemented method (column 4, lines 41-51), claim 14 is rejected for the same reasons given above for claim 6.

42. Claim 20 recites an apparatus comprising a computing system and a virtual machine monitor which implements the method of claim 6. As Bugnion teaches a computer-implemented method (column 4, lines 41-51), claim 20 is rejected for the same reasons given above for claim 6.

Conclusion

Art considered pertinent by the examiner but not applied has been cited on form PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Proctor whose telephone number is (571) 272-3713. The examiner can normally be reached on 8:30 am-4:30 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J Teska can be reached on (571) 272-3716. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason Proctor
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